User's Manual and Reference Guide:

PM12PTO

User's Manual and Reference Guide:

TABLE OF CONTENTS

Page#

1.0 GENERAL INFORMATION…… 1-1

1.1 Machine Overview…….. *1-1*
1.2 Safety and Warnings…….. *1-1*

2.0 MACHINE SUMMARY…… 2-1

2.1 Machine Configuration…… *2-2*
2.2 Function Flow…… *2-2*
2.3 General Maintenance…… *2-3*

3.0 GETTING STARTED…… 3-1

3.1 Understanding Your Material…… *3-1*
3.1.1 Proper Moisture…….. *3-1*
3.1.2 Particle Size…… *3-1*
3.2 Warming-Up the Pellet Mill…….. *3-2*
3.3 Die Conditioning…….. *3-3*

4.0 TROUBLE SHOOTING…… 4-1

4.1 Understand the Problem…… *4-1*
4.2 Unplugging the Die…….. *4-1*
4.3 Rollers Not Rolling…… *4-1*
4.4 Pellet Quality…… *4-2*
4.5 Excessive Wearing of Die and or Rollers…… *4-2*
4.6 Safety and Warnings…….. *1-1*

5.0 WARRANTY AND CONDITIONS…….. 5-1

6.0 SAFETY & WARNINGS…….. 6-1

7.0 BUSKIRK ENGINEERING TERMS AND CONDITIONS OF SALE…… 7-1

8.0 NOTES…… 8-1

1.0 GENERAL INFORMATION

1.1 Machine Overview:

This machine is designed to take products that are conditioned for pelleting. Introducing products that are not conducive for pelleting (rock, metal, unconditioned wood) will damage the pellet mill and void all warranties.

The pelleting process requires high compression, heat and torque to produce a pellet. Operator safety must be the first thought of all pelleting systems. Disregarding Safety and Warnings could result in injury or death.

The PM12PTO requires a minimum of a 30HP tractor to operate. It has been supplied with a PTO connector and frame that must be installed per recommendation of your tractor's manufacturer. The gearbox the Pellet Mill utilizes is at a 3:1 ratio, the pellet quality has a lot to do with the proper speed of the PTO. In most cases, the required PTO speed is between 300-400 RPMs.

1.2 Safety and Warnings:

WARNING

INTERNAL MOVING PARTS ARE DANGEROUS!

BEFORE ATTEMPTING TO SERVICE OR PRIOR TO INTERNAL INSPECTION, DISCONNECT PTO SHAFT FROM POWER SOURCE (TRACTOR PTO).

DO NOT OPERATE THIS EQUIPMENT WITHOUT REQUIRED SAFETY GUARDS AND COVERS IN PLACE

KEEP HANDS CLEAR OF INLETS AND DISCHARGES

BUSKIRK ENGINEERING

Biomass Densification Systems

2.0 MACHINE SUMMARY

2.1 Machine specifications:

PM12PTO PELLET MILL

No. of Dies in Mill…….....1

Die Size.....…….....12” Ø x 1 – ½” Thick

No. of Rollers in Mill …….....2

Roll Size.....…….....4” Ø x 2” Wide

Machine Extreme Height.....….....……..…….48”

Machine Extreme Length.....….....…….....25"

Machine Extreme Width.....….....……..…….....….24"

Machine Length on Floor.....….....……..…….....25"

Machine Width on Floor.....….....…….....….....24"

Machine Height Where Input Material Enters.....…….....48”

Shipping Weight.....…….....550 lbs.

Net Machine Weight……..450 lbs.

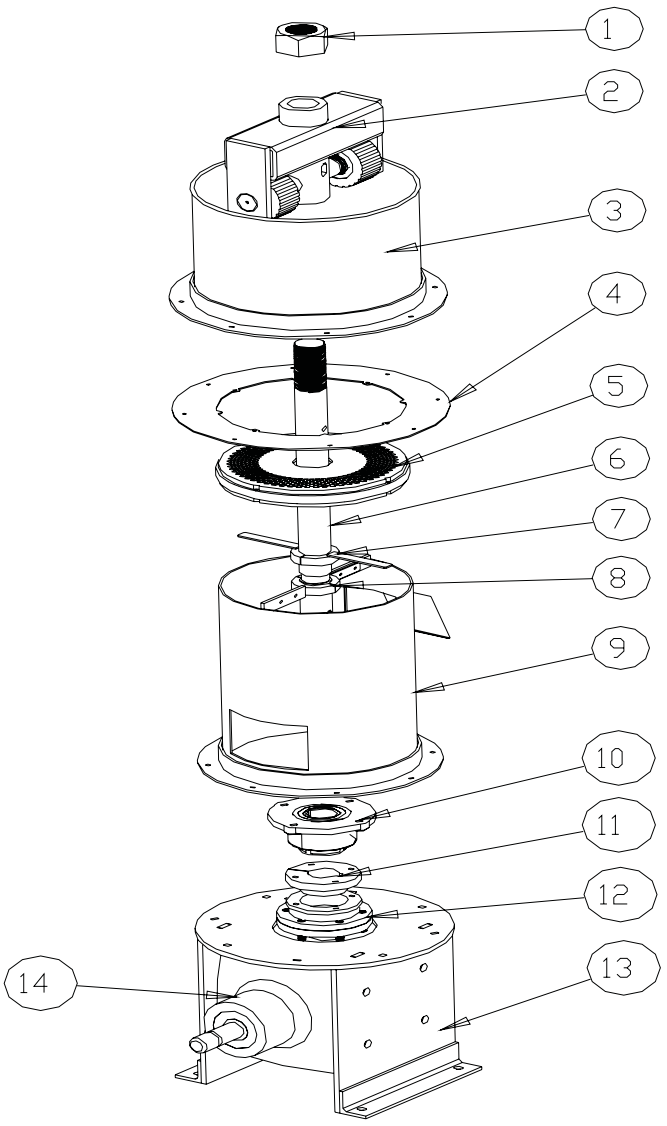
Approximate Capacities (lbs.per our.)*

Grasses (finely ground under ¼” Size).....…….....1000-1200
Biomass Material, Generic (finely ground under ¼” Size)..……..... 1000-1200
Wood, hardwood sawdust (finely ground under ¼” Size).....600-800

Horse Power Requirements:
Main Drive, PTO…….……...Suggested, 30-50 HP, 540 RPM
Main Drive, PM1220…….……20 HP, 3 Phase, 230/460 Volt, 60 Hz, 1800 RPM
Main Drive, PM1230…….……30 HP, 3 Phase, 230/460 Volt, 60 Hz, 1800 RPM

*All Capacities will vary depending upon size, moisture levels, and impurities of incoming material.

2.2 Machine configuration:



PM12PTO
12” PTO DRIVEN
PELLET MILL

No.	Qty.	Part No.	Description
1	1	2"-12 Nut	Main Nut
2	1	PM12-RF	Roller Frame
3	1	PM12-0006	Hopper
4	1	PM12-0009	Hopper Flange
5	1	PM12-0001	1-1/2"X12" Die
6	1	PM12-0011	Main Shaft
7	1	PM12-0017	Cutting Blade
8	1	PM12-0019	Wiper
9	1	PM12-0020	Housing
10	1	PM12-0039	Thrust Bearing
11	1	PM12-0042	Bushing
12	1	PM12-0120	Coupler Plate
13	1	PM12-44,45	Frame Support
14	1	PM12-0027	Gear Box

2.3 General Maintenance:

2.3.1 Lubrication

Be sure all bearings are properly lubricated with a quality grade of pressure grease. For pellet mills operating in extreme seasonal ambient temperatures the type of grease used should take into account the seasonal temperature changes. The pellet mill should be lubricated at regular intervals depending on the location of the bearing.

Bearings should be lubricated after every 250 hours of operation. One or two pumps on a **standard hand pump grease** gun is sufficient. High-pressure air operated grease guns are not recommended!

After initial lubricating of bearings, they should be lubricated once every 100 hours. Again, High-pressure air operated grease guns are not recommended!

2.3.2 Die Inspection & Maintenance

The die should be visually inspected prior to each start-up and after shut down. Inspection entails visual appraisal of the die, ensuring no foreign objects are lodged in die borings and checking for excessive wear. Each die has a longevity of 1500 hours under normal running conditions. Each side is expected to run 750 hours before removing and run on opposite side.

2.3.3 Roller Inspection & Maintenance

The rollers should be visually inspected prior to each start-up and after shut down. Inspection entails visual appraisal of each roller, ensuring no foreign objects are impeding the free rolling motion of the rollers and checking for any excessive wear. Roller longevity is expected to be 3000 hours.

3.0 GETTING STARTED

3.1 Understanding Your Material:

3.1.1 Proper Moisture

Most organic material pelletizes when the moisture content is between 10 and 15%. The moisture aids in the densification process where it is a means to transfer heat from the die to the material, whereby the lignin within the organic matter melts and acts like a glue to hold the material in a pelleted form.

Without the proper moisture, heat does not transfer properly ad the material does not heat up enough to create a good pellet. The pellet will crumble.

With too much moisture, the die never gets hot enough to create a pellet and the material coming out will crumble as well.

3.1.2 Particle Size

Prior to pelletizing your material, the incoming material needs to be reduced in size. Various machines may be used as size reduction tools. Some machines are, Hammer Mills, Shredders, and Chippers.

The size of the material may vary depnding upon incoming feed stock. Follow the following guidelines for incoming material sizes:

Cellulosic Material* (Cardboard & Paper)	¾”-1” Ø
Biomass Material (Crop Residue, Grasses)	less than ¼ ”Ø
Woody Material (Sawdust)	less than ¼ ”Ø

*Special care should be taken to not shred paper material into light-weight fluffy material, it will not flow and moisture levels will make it tricky to pellet.

3.2 Warming-Up the Pellet Mill:

The die inside the pellet mill needs to be between 200° and 220° F to properly make a pellet. Of course the temperature necessary to make a pellet will vary from material to material. A list of materials and the proper die temperature needed is in Chart 1.

In order to obtain the proper temperature the mill needs to be warmed up. If your mill is equipped with a die warmer, simply turn on the die warmer and wait for the die to reach the optimum temperature. This should take approximately 5 minutes.

If there is no die warmer equipped on your mill, the die will need to be warmed manually. In order to do so, please follows the following procedure.

MANUAL DIE WARMING PROCEDURE

1. Input material must be ideal for pellet production. It must have the proper moisture content and lignin content.
2. Place a bucket or catcall of some kind under the discharge of the pellet mill. Material collected will be re-run through the mill to aide in warming the mill.
3. Turn the power on to the mill.
4. Slowly introduce organic material to be pelleted into the input funnel. Do not overflow the chamber.
5. After a few minutes the mill will begin to expel ground material or a poorly formed pellet. Continue to add material to the mill input chamber, being careful not to overfill the chamber.
6. As the die begins to warm you will observe water vapor exiting the top of the input funnel. This is an indication that the die is beginning to warm up.
7. Once you begin to see vapor, take the material collected at the discharge and reintroduce the material into the input funnel.
8. The die will prove to be warm enough to produce pellets when pellets being discharged are durable and compressed. At this point the pellet may not be hard, but as it cools it will harden. The die is now ready for continued pellet production.

3.3 Die Conditioning:

A replacement die will be shipped to you in a pre-conditioned state, that is, no material has been run through the die. The following procedure needs to be followed to condition your die for production of pellets.

Die Conditioning Procedure

1. Place receiving bucket at mill discharge.
2. Power up pellet mill.
3. Pour pellet conditioning material into mill input chamber through funnel at a gradual rate, being careful to not overfill chamber.
4. Material will begin to flow through the die, as the material flows through, it will begin to take the scale out of the die cavities through friction.
5. Continue to pour material into mill, when finished feeding material, remove bucket from discharge and pour contents back into input chamber and recycle material. This process should be performed over and over for approximately 10minutes or 10 times.

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4.0 TROUBLE SHOOTING

4.1 Understanding the Problem:

MILL WILL NOT START

POSSIBLE CAUSES	REMEDY
Improper Wiring	-Check system to ensure that motor is wired correctly.
Rollers have seized	-Disconnect Power Source. -Check for debris in front of rollers, if debris is present, remove. -After debris is removed, reconnect power and restart mill.
Rollers have seized	-If mill still does not start after above remedy solution, contact factory.

PELLET WILL NOT FORM

POSSIBLE CAUSES	REMEDY
Improper Input Material	-Check input material for proper moisture level. Moisture content shall be between 10-15% for proper pelletizing to occur. -Check input material for proper amount of lignin. If material is not organic in nature, it will not have lignin and therefore will not be able to be pelletized.

DIE HAS SEIZED

POSSIBLE CAUSES	REMEDY
Material is too dry and die is not properly lubricated	-Clean die by soaking with glycerin (length of time for soaking depends upon material in die, woody material may take 24 hours of soaking before releasing from die.) -Drill out individual borings with hand drill.

PELLETS TOO DRY

POSSIBLE CAUSES	REMEDY
Lack of moisture in feedstock	Add water or moist material prior to pelletitizing

PELLETS TOO WET

POSSIBLE CAUSES	REMEDY
Too much moisture in feedstock	Dry material or mix with lower moisture material

LACKLUSTER PELLETS

POSSIBLE CAUSES	REMEDY
Low pellet temperature	Allow mill to heat up
Wet infeed material	Allow mill to heat up
Dry infeed material	Allow mill to heat up

NON-DURABLE PELLETS

POSSIBLE CAUSES	REMEDY
Pellets not cooled properly	Cool pellets on screen or cooling conveyor
Low pellet temperature	Allow mill to heat up

EXCESSIVE WEARING OF DIE AND OR ROLLERS

POSSIBLE CAUSES	REMEDY
Foreign matter in infeed material	Always use clean biomass material
Improperly prepared material	Hammer mill of screen to the correct particle size

5.0 WARRANTY AND CONDITIONS

CERTIFICATE OF WARRANTY

Buskirk Engineering Manufacturers Warranty for the following products:

Pellet Mills, Hammer Mills, Laboratory Pellet Mills, Conveyors, Cooling Conveyors, Vibratory Conveyers, Augers, Bucket Elevators, Mixers and Blenders.

Buskirk Engineering hereby warrants each new product to be free from defects in Material and workmanship for a period of one (1) year from the date of shipment. Buskirk Engineering will replace without charge any Buskirk Engineering Product or part or component thereof, which is defective in material or workmanship (other than transportation charges, which shall be borne by the purchaser/user), if notified in writing of such defect by the purchaser/user within such period. Buskirk Engineering liability for defective parts and components not manufactured by Buskirk Engineering, but included in the Buskirk Engineering Products (such as electric motors, AC or DC controllers and belts) is necessarily limited to the warranty or guarantee provided by the manufacturer or supplier of such parts or components. Buskirk Engineering reserves the right to require the purchaser/user to return the defective Buskirk Engineering Product or part or component thereof to the Buskirk Engineering factory for inspection, as well as the right to determine the validity of any warranty claim in its sole discretion.

This warranty shall not apply and shall be void under the following conditions:

1. The Buskirk Engineering Product has not been purchased from Buskirk Engineering or an authorized representative of Buskirk Engineering .

2. The Buskirk Engineering Product has been removed from its original installation site.

3. Any part of the Buskirk Engineering Product has been altered, modified, or changed, except by Buskirk Engineering or with Buskirk Engineering written authorization.

4. Attachments or devices unsuitable to the Buskirk Engineering Product have been used on or in conjunction with it.

5. The Buskirk Engineering Product has not been installed, used, operated, handled, or serviced in accordance with the applicable instruction manual.

6. The Buskirk Engineering Product is a replacement part or component, which is installed in a previously sold (used) piece of equipment.

Buskirk Engineering reserves the right to make changes in design or improvements in its products without obligation whatsoever to prior Purchaser-User of such products.

Buskirk Engineering will pass on to a Purchaser-User only such warranty as it shall receive on products or components not of its manufactured from the manufacturer or supplier thereof.

This warranty is expressly in lieu of any other express or implied warranties, including any implied warranty of merchantability of fitness and of any other obligation on the part of Buskirk Engineering and may not be altered, modified, or changed in any way except in writing by an officer of Buskirk Engineering.

Buskirk Engineering shall not be liable for any loss or damage directly or indirectly arising from the use of its products or otherwise, or for any special or consequential damages of any nature.

WARNING!

Do not attempt to work on, clean or service this equipment or open or remove any protective cover, guard, grate or maintenance panel until the power has been turned off and locked out and the machine has come to a complete stop.

WARNING

INTERNAL MOVING PARTS ARE DANGEROUS!

BEFORE ATTEMPTING TO SERVICE OR PRIOR TO INTERNAL INSPECTION, DISCONNECT PTO SHAFT FROM POWER SOURCE (TRACTOR PTO).

DO NOT OPERATE THIS EQUIPMENT WITHOUT REQUIRED SAFETY GUARDS AND COVERS IN PLACE

KEEP HANDS CLEAR OF INLETS AND DISCHARGES

BUSKIRK ENGINEERING

Biomass Densification Systems

TERMS AND CONDITIONS OF SALE

1. **All customer orders are subject to acceptance and approval by Buskirk Engineering ("Seller") at its head office in Ossian, Indiana.**

2. The terms and conditions contained herein, including those on the front side of this document, shall constitute the entire agreement for the purchase and sale of the goods sold hereunder. Any acceptance contained herein is expressly conditional upon Buyers assent to such terms and conditions as are different from, in addition to or at variance with the terms and conditions contained in Buyer's purchase order or request for quotation (if any). Such assent shall be deemed to occur upon the failure of Buyer to object in writing specifically to any of Seller's terms and conditions within 14 days from the initial receipt thereof. Any terms and conditions contained in Buyer's purchase order or request for quotation which are different from, in addition to or at variance with Sellers terms and conditions shall not be binding upon Seller, and Seller hereby objects thereto.

3. Payment terms are as specified on the front side of the invoice. Interest shall be charged at the rate of 1 ½ per month (19.6% per year) on past due accounts.

4. Any federal, state, provincial or local tax (including goods and services tax or excise tax) imposed on seller as a result of this sale shall be paid by Buyer; taxes are not included in any quotation except as specifically stated. No charge shall be made for packing or crating goods unless specifically stated.

5. Delivery terms are F.O.B. Seller's plant or supplier's plant as applicable Seller shall use the least cost method of transportation unless specifically authorized by Buyer to use a higher cost method of transportation. Any increase in transportation rates or taxes prior to date of shipment will be paid by Buyer.

6. Seller has the right to deliver all of the goods at one time or in portions from time to time on or before the scheduled delivery date. Special shipping instructions must be received more than 10 working days before the scheduled shipping date. All "will call" shipments must be picked up within one week of notification of order completion or the order will be shipped "best way" to Buyer. If desired, Seller will arrange for warehousing at the expense of Buyer.

7. Claims against Seller for defective or damaged goods, shortages, delays or failures in shipment or delivery or for any other cause shall be deemed waived and released by Buyer unless made in writing within 10 days of the date of delivery.

8. Title to and the right to repossess all goods supplied is reserved by Seller until such goods are paid for in full, in cash or in accordance with any finance sale contracts pertaining thereto. Risk of loss or damage (including risk of loss or damage from shipping) shall pass to Buyer at the shipping point. Buyer shall be responsible for processing all claims resulting from loss or damage from shipping.

9. No order accepted by Seller may be cancelled by Buyer without the consent of Seller. If Seller allows any cancellation, Buyer shall pay on demand all costs, expenses, losses and damages sustained by Seller in connection with such order or its cancellation, including administrative, engineering, modification and reconditioning expenses and loss of profit.

TERMS AND CONDITIONS OF SALE continued

10. In the event of any delay in Seller's performance concerning delivery of goods due to strikes, labor difficulties, riot, war, fires, delay or default of a common carrier, failure of or curtailment in Seller's usual sources of supply, governmental decrees or orders or any other cause beyond Seller's reasonable control. Seller shall not be liable for any losses or damage arising there from and shall have such additional time as is reasonably necessary under the circumstances to perform its obligations.

11. Seller warrants its manufactured products to be free from defects in workmanship and material for a period of one year from date of shipment. Seller will replace without charge any defective part if returned upon factory authorization with transportation charges prepaid, within such period. Notwithstanding the foregoing Seller's liability for defective purchased parts included in manufactured products is necessarily limited to the warranty or guarantee provided by the manufacturer of such parts.

12. Any Return of Merchandise is subject to a 30% Restock Fee

13. Except for the foregoing warranty, Seller makes no representation, warranty or guarantee, express or implied, concerning the goods, this order or any other matter, and any implied warranty of merchantability or fitness for a particular purpose which exceeds the foregoing warranty is disclaimed by Seller and excluded from any made by acceptance of an order by Seller. Seller will not be liable for any consequential damages, loss or expenses arising in connection with the use or the inability to use the goods for any purpose whatever. Seller's maximum liability shall not in any case exceed the cost of replacing defective parts. No salesman, manufacturer's representative or other person may make or has the authority to make any representation, warranty or guarantee express or implied on behalf of Seller with respect to the use or application of such goods or which is inconsistent with these terms and conditions.

14. These Terms and Conditions shall be governed by the laws of the State of Indiana. Any provision hereof which is contrary to any applicable law or administrative regulation having the effect of law shall not invalidate any other provision hereof, and any provision required to be included herein by any applicable law or administrative regulation having the effect of law shall be deemed to be incorporated herein. Stenographic and clerical errors are subject to correction by Seller.

15. Buyer shall hold Seller harmless from and release and not make claim or suit against Seller because of any suits, claims, losses and other liabilities made against or suffered by Buyer as a result of or arising from any claim of infringement of patent, copyright, trademark or other common law proprietary right or from any claim of unfair trade or unfair competition, resulting from or occasioned by Buyer's purchase, possession, use, sale or delivery of the goods in the U.S.A. or Canada.

16. For Quebec residents only: It is the express wish of the parties hereto that this contract and all related documents be drawn up in English/C'est la volonte express des parties aux presentes que ce contral el less documents y afferents soient rediges en langue anglaise.

NOTES:

12" Pellet Mill with 20 HP Motor

12" PTO Pellet Mill

CC8 - 8' Cooling Conveyor